

ABSTRACT

The present invention provides a bump forming apparatus which can prevent charge appearance semiconductor substrates from pyroelectric breakdown and physical failures, a method carried out by the bump forming apparatus for removing charge of charge appearance semiconductor substrates, a charge removing unit for charge appearance semiconductor substrates, and a charge appearance semiconductor substrate. At least when the wafer is cooled after the bump bonding is connected on the wafer, electric charge accumulated on the wafer because of the cooling is removed through direct contact with a post-forming bumps heating device, or the charge is removed by a decrease in temperature control so that charge can be removed in a noncontact state. Therefore, an amount of charge of the wafer can be reduced in comparison with the conventional art, so that the wafer is prevented from pyroelectric breakdown and damage such as a break or the like to the wafer itself.